The Environmentally-Responsible Dental Office:

A Guide to Pollution Prevention & Proper Waste Management in Dental Offices





The following guide was created by the Virginia Dental Association and the Virginia Department of Environmental Quality (VADEQ). However, the guide's structure and many of the techniques discussed were originally published in June of 1999 by the National Wildlife Federation and the Vermont State Dental Society (VSDS).

A Message from the VDA President:

One of the things I have always been impressed with in the dental profession is that most dentists do the right things for the right reasons. I am really proud to be able to say that. This Guide was produced to help all Virginia dentists continue to do the right thing. We are well educated and can clearly see the burden that our constantly growing society places on the environment. We understand and are concerned about having a healthy environment. We want to be good stewards and leave for our children and grandchildren a world that is healthy and clean. We view ourselves as part of a 'partnership for a sustainable future.' It is incumbent upon us to take the lead in this effort and not add to the environmental burden.

This comprehensive guide will show you how to become a better caretaker of the environment. It offers simple, no frills, easy to implement ideas that you can employ immediately to reduce the excessive environmentally hazardous waste that simply is not necessary. Read it. Follow it. Make these practices a part of your office routine. It is not difficult, and it will make a difference. We are not big producers of environmental hazards, but we do contribute. We can't do it alone, but we can do our part. Our efforts will pay off in the end for all of us, our children, our grandchildren, and generations to come.

As responsible citizens, we must accept this challenge and do our part. Let's start now.

Bruce R. Hutchison, DDS
President, Virginia Dental Association

Thanks to the VDA Infection Control Committee which contributed to this manual!

Acknowledgements

The Virginia Dental Association represents more than 3000 dentists in the Commonwealth of Virginia. The VDA is committed to promoting worthwhile efforts that further the views of its members. Furthermore, the VDA strives to develop resources for its membership that facilitate compliance with applicable laws and regulations. This manual achieves both of these goals and will hopefully provide financial benefits to practicing dentists in Virginia while helping Virginia's environment.

The Virginia Department of Environmental Quality manages the major environmental programs in Virginia. The VA DEQ is dedicated to protecting Virginia's environment and promoting the health and well being of the citizens of the Commonwealth. VA DEQ supports the Virginia Dental Association in this voluntary effort to reduce environmental impacts of dental operations. Specifically, this program is supported in association with its initiative to reduce the use and releases of Mercury. Mercury is at the top of EPA's list of priority chemicals for Virginia.

For additional copies of this guide or more information, please contact:

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—OR—

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Special Thanks again to the National Wildlife Federation and the Vermont State Dental Society for their help in producing this guide. We are grateful to Dr. P.L. Fan, Senior Director of International Science and Standards for the ADA, for his exceptional editing contribution. Additional thanks to Terri Goldberg of NEWMOA for her research assistance.

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Foreword

The Environmentally Responsible Dental Office: A Guide to Proper Waste Management in Dental Offices is intended to assist Virginia dentists in dealing with mercury and other dental office waste problems in a proactive way. This guide provides dentists with the information they need to properly manage mercury and amalgam waste, and provides suggestions for managing the other wastes that result from the day-to-day activities of a dental office such as:

- biomedical waste
- cleaners for X-ray developer systems
- used X-ray fixers and developers
- chemiclave/chemical sterilant solutions
- general office waste
- disinfectants, cleaners, and other chemicals

In addition to information on instruction on proper ***waste management***, this guide places an emphasis on ***pollution prevention*** – i.e., minimizing or avoiding the generation of waste in the first place. Throughout this document, references will be made to the appropriate parties to contact for information on issues such as amalgam recycling, silver reclamation, regulated medical wastes, and hazardous waste management.

Why Are We So Concerned with Mercury?

Health agencies entrusted with protecting the public health have all agreed that amalgam is a safe material to use to restore teeth. These agencies include Food and Drug Administration, World Health Organization, and Centers for Disease Control and Prevention. The practice of dentistry can result in the release of mercury-containing amalgam to the environment. Even though mercury is a naturally occurring chemical, it bioaccumulates in the tissues of fish as a persistent, toxic contaminant. In dental use, mercury is chemically bound to other metals such as silver, copper, tin and zinc to create an extremely stable restorative material. Mercury is at or near the top of the EPA's National Priority List of hazardous chemicals. For Virginia, mercury is at the top, meaning that it is the priority toxin of concern. The Virginia Department of Environmental Quality is working with industries that use mercury and contribute mercury contamination to the environment. As an industry, the entire healthcare sector is the number 4 contributor of mercury to the environment, contributing more than 10 percent of the nation's mercury.

Dentistry as a whole contributes 1 percent to the nation's mercury. Even though dentistry contributes such a small percentage, we - as professionals wanting to promote a healthy environment - should minimize this as much as possible. Once in the environment, elemental mercury may eventually be converted to methyl mercury by benthic microorganisms and accumulate in the soil and fauna. Fish ingest the methyl mercury-containng fauna and eventually bio-accumulates in the food chain. Large fish, such as shark, swordfish, king mackeral, and tilefish, can have very high levels of methylmercury in their bodies.

At high levels methyl-mercury can affect the developing nervous system. Therefore, populations who are at greatest risk for health effects from consuming contaminated fish include pregnant women, women planning to become pregnant and children under the age of 6.

Advisories regarding the consumption of fishhave been issued in more than 2000 water-bodies across 41 states due to mercury contamination. In Virginia, over 333 river miles have " fish consumption advisories" due to mercury content.

Fish Consumption Advisories in Virginia due to Mercury Contamination

- 103.4 miles of the South River & the Southern Fork of the Shenandoah River
- 85.4 miles of the North Fork of the Holston River
- 34 miles of the Pamunkey River
- 40 miles of the Mataponi River
- 7 miles of Herring Creek in King William County
- 66 miles of the Blackwater River
- 18 miles of the Great Dismal Swamp
- 270 acres Lake Gordonsville

Currently, there is no statewide mandate to reduce amalgam entering the environment from our dental offices. However, local water authorities throughout Virginia are coming under increased pressure to meet certain thresholds of mercury releases. The local "publicly owned treatment works" (POTWs) have strict limits that they must achieve as outlined in their wastewater discharge permits. Therefore, some areas may be under more pressure than others to reduce mercury levels.

The POTW's are looking at all sources of mercury for reduction including dental offices. It is incumbent on us to follow the guidelines as outlined in this manual to most importantly promote a healthy environment but also to decrease the chances that the POTW's would need to regulate dental offices in some fashion or to impose pre-permit fees. Voluntary reduction of amalgam leaving our dental offices would be beneficial to the environment and to our offices.

How Does Dental Amalgam Affect the Environment?

There are several ways that mercury from amalgam can get into the environment:

- Wastewater. Amalgam that is rinsed down drains or escapes from poorly maintained chairside traps and vacuum filters enters the wastewater stream and eventually the wastewater treatment plant or the septic system. Any amalgams in treated wastewater will either end up in the sewage grit, sewage sludge, which is often land applied, or in the liquid discharged from the plant. The vast majority is captured by the POTW in its sludge. Also, in Virginia, many cities were originally designed with *Combined Sewerage Overflows (CSOs)* sewage collection systems. These systems also collect and treat stormwater runoff – the problem is that treatment capacities are typically limited. Therefore, in large-scale rain events, much of the combined untreated sewage and stormwater is diverted directly into receiving rivers. Any mercury or scrap amalgam would go untreated.

- Regulated Medical Waste. Amalgam can be mixed with potentially infectious material (e.g. blood, teeth); therefore, it may mistakenly be placed in a Biohazard or Red Bag. Scrap amalgam, both contact (i.e. amalgam that has been in contact with the patient) and non-contact (i.e. excess mix left at the end of a dental procedure), should not be placed in the Biohazard or Red Bag. Amalgam that is put into red biohazard bags is typically incinerated or autoclaved. If amalgam is present in waste that is incinerated, the mercury will volatilize and enter the atmosphere. The volatilized mercury then precipitates to the ground or into a waterbody. If amalgam is present in waste that is autoclaved, the volatilized mercury may escape to the environment from the autoclave when the door is opened or leave the treatment facility with wastewater.

- Garbage. If amalgam scrap is discarded into ordinary trash, it may eventually be incinerated (see previous paragraph) or placed in a landfill. Land filling would be the better fo the two options since the mercury in the amalgam is bound but considering that we, as dentists, have no control over what happens to our trash, we whould not dispose of amalgam in the trash.

- Bulk Mercury/Spills. Older techniques that use dispensers to dispense elemental (also referred to as free, bulk, or raw) mercury for amalgam production can lead to accidental spills and increase the chances that elemental mercury will end up in the wastestream. In addition, if the elemental mercury is poured into the drain, it goes directly into wastewater; or it may settle in sink traps, gradually releasing into the municipal sanitary sewer over time. Some offices still have old supplies of mercury that should be properly recycled through a handler. Otherwise, dentists run the continued risk of spills, costly clean-ups and possible long-term liabilities from contamination. In 2000, the Virginia Dental Association sponsored a collection of elemental mercury resulting in the collection of nearly 400 pounds of bulk mercury.

- Mercury can be present in other office equipment, such as thermometers, blood-pressure machines, thermostats, and fluorescent light bulbs. Any of these items can end up in the garbage and may impact the environment. All of these items can be recycled through a local waste handler.

- For more on Mercury Reduction efforts in Virginia, referencewww.deq.virginia..gov/p2/mercury.

Reducing the Possibility of Mercury Releases to the Environment & Other Dental Office Wastes: Opportunities for Dentists

Dentists have many options available to them to reduce the amount of amalgam and other dental wastes inadvertently leaving their office. The information presented in this guide falls into two categories of waste management strategies: **pollution prevention** and **best management practices**.

Pollution Prevention (or P2)

The goal of pollution prevention (P2) is to *voluntarily* reduce or eliminate the use of toxic or polluting substances *at the source*. Pollution prevention activities and recycling in dental offices are essential in order to minimize releases of polluting substances into the sewer system, medical waste stream, or ordinary trash. Because P2 focuses at the source of the waste, P2 is very cost-conscious, especially in terms of avoiding long-term problems like plumbing or other office contamination. However, most facilities that implement a P2 program find that they save money immediately on disposal and handling costs. In addition, P2 efforts always facilitate compliance with the hazardous waste regulations and reduce long-term liabilities.

For dentistry, one effective strategy is the use of products that are less harmful to the environment. The dental profession will continue to evaluate materials and equipment that would support the goals of BMP's. The choices are a professional decision and should be used when apporpriate and in the best interest of the patient.

- **Product substitution** of non- or less-toxic materials.
- Improved **process efficiencies** or **technological improvements** which result in less wastes.
- Improved **inventory control** which ensures proper labeling and understanding of handling procedures for hazardous materials.
- **Preventative maintenance** of equipment and procedures which allow for maximum efficiency and prevention of leaks and spills.
- **Waste segregation** which allows for efficient reuse and recycling opportunities.
- **Energy & water efficiencies and conservation** techniques which provide for reduced impacts and cost savings.

A good P2 Program includes annual goals for improving environmental performance and can include measures that prepare for future improvements such as: education and training, collection of waste data, assessment and improvement of housekeeping practices, a chemical inventory control plan, inventory of purchasing, or development of a recycling program. Below are some P2 examples for dentists that are voluntary and subject to economic feasibility. Many more P2 examples are included in the text of this manual.

- Recycle any unused bulk elemental mercury
- Use the correct size precapsulated amalgam alloy to minimize the amount of unused material.
- Consider using amalgam substitutes in cases where they are clinically appropriate.
- Use non-hazardous or biodegradable detergents for clean up.
- Start a rebag education an reduction initiative.
- Use non-chromium containing X-ray developer system cleaners.
- Steam sterilization is the most environmentally-friendly method considering it does not use any chemicals in the process.
- Educate your staff and cleaning service on segregation of wastes for amalgam, regulated medical wastes, sharps, and other recyclables. Be sure to include them in the P2 program and let them know it is benefiting them through decreased handling and exposure.

Best Management Practices (BMP's)

While pollution prevention is the ideal solution for addressing waste management issues, implementation of P2 measures is not always immediately feasible in practice. Therefore, the following sections present information on best management practices for the dental office. Best management practices are economically achievable measures or actions that can be used to control or reduce the entry of pollutants into the environment. P2 combined with BMP's will help to ensure regulatory compliance. The first step is to understand your responsibilities for managing wastes.

Hazardous Wastes / Generator Status

Many of the materials that dentists use are made from or contain hazardous constituents. When these materials are used, spent, or can no longer be used and must be discarded, some of them may be regulated as hazardous wastes.

Even though many dental offices are relatively small operations, as a commercial facility, you are responsible for the proper management, handling, and recycling or disposal of hazardous materials within and leaving your facility. Although most dental offices only generate small amounts of hazardous wastes, it is important for you to determine your hazardous waste generator status. Most dentists are considered to be *Conditionally Exempt Small Quantity Generators (CESQG),* although some facilities may qualify as Small Quantity Generators (SQG). Some larger dental clinics could be considered in the Large Quantity Generator (LQG) category. Your generator status will determine which regulations you need to follow. No matter how small a quantity of hazardous waste is produced, dental offices are not allowed to use household hazardous waste collections for disposal of their waste. The following definitions will help you determine the generator category of your dental office.

Hazardous Materials

- Mercury
- Sterilants
- Batteries
- Glutaraldehyde
- Cleaners
- Fixers & Foils
- Fluorescent Lamps
- Computer Equipment
- Epinephrine
- Various Other Drugs

- **Conditionally Exempt Small Quantity Generators (CESQG**): A CESQG generates less than 100 kilograms (220 pounds) of hazardous waste per month. Most dentists fall into this category.
- **Small Quantity Generator (SQG):** An SQG generates between 100 and 1000 kilograms (or 220 and 2200 pounds) of hazardous waste per month.
- **Large Quantity Generator (LQG**): An LQG generates greater than 1000 kilograms (2200 pounds) of hazardous waste per month.

Reporting and regulatory requirements become increasingly stringent as more hazardous waste is handled. If you are a "CESQG", you simply need to document that you are recycling your hazardous materials in a manner approved under the regulations or disposing of them through a licensed handler/ transporter of hazardous wastes. If you fall into the other two categories, you should contact your regional office of the Virginia DEQ 1-804-698-4447 concerning the reporting and recordkeeping requirements.

Recycle Your Hazardous Materials!
$$ Save Money & Reduce $$
Recordkeeping

Universal Waste. Hazardous waste regulations provide a conditional exclusion for certain types of hazardous wastes, designated as "Universal Wastes", that are being collected and recycled. The Universal Waste Rule applies to specific types ofitems. If these materials are managed as universal wastes, they do not have to be declared and managed as hazardous wastes. In addition, these quantities do not count towards the generator status mentioned above. The current universal wastes common to dental offices are fluorescent lamps or other mercury containing lamps, and Ni-Cd, silver oxide, lithium or other small equipment batteries (other than common carbon-zinc or alkaline batteries). Mercury thermometers, while not currently universal waste, may be managed as an intact

commercial product for recycling/reclaim. However, if they are broken they will need to be managed as a hazardous waste. Certain unused materials, e.g. expired shelf-life pharmaceuticals, may be returned to the distributor. In general, if materials are not being discarded but can be used by others for their legitimate originally intended purpose as a product, they may be treated as a material rather than a waste.

For more information on Hazardous Wastes, you can access the *Virginia Hazardous Waste Regulations* at www.deq.virginia.gov/waste/wastereg60.html.

Remember: It is your responsibility as a dentist to determine the regulatory status of the waste material leaving your office. You may want to review your material safety data sheets regarding the toxic properties of your waste.

Additional Benefits for Environmentally-Responsible Dentists

Show Your Commitment!

All of the measures described in this manual will help to minimize your clinic's impact on the environment. Whether it's managing amalgam wastes correctly, or conserving water and energy, or simply providing for recycling of cans and office paper; we are confident that your patients will appreciate your commitment to help protect their environment!

Get Recognized!

The Virginia DEQ's Office of Pollution Prevention has developed and supports several voluntary programs to recognize the voluntary activities of Virginia businesses and other entities. These programs are designed to provide directed assistance, public recognition, and opportunities for awards that will further additional voluntary activities. Any dental office that is using this manual and is committed to protecting and improving the environment is eligible for these programs. There are no fees associated with any of these programs.

Virginia Hospitals for a Healthy Environment (or VH2E). The Virginia Dental Association is actually a Charter Partner of this program dedicated to reducing the environmental impacts of the healthcare industry. Although hospitals are targeted, VH2E was developed to include **ALL Virginia healthcare facilities** of any size, **including dental practices**. This is a voluntary state program that mirrors a national partnership between the American Hospital Association and the US Environmental Protection Agency, and its goals are to eliminate mercury and reduce other wastes in healthcare facilities.

VH2E asks its members to commit to consider reducing wastes in 3 categories:

(1) Mercury Elimination
(2) Waste Reduction
(3) Toxicity Reduction

Member facilities are asked to report any progress that they are making on annual basis. It is understood that facilities cannot make dramatic changes overnight. However, the VH2E program provides resources and encourages facilities to set annual waste reduction goals. Any dentist who commits to the VH2E program will receive a VH2E plaque for display and be listed on the VH2E and national H2E websites. In addition, VH2E members are eligible for awards and additional public recognition opportunities. For more information, see www.deq.virginia.gov/p2/vh2e or contact VADEQ's Tom Griffin at 804-698-4545 or rtgriffin@deq.virginia.gov.

Businesses for the Bay is a voluntary team of forward-looking businesses, industries, government facilities and other organizations within the Chesapeake Bay watershed. Businesses for the Bay (B4Bay) members are committed to the long-term improvement of the quality of the Bay and

its rivers through widespread, voluntary implementation of pollution prevention practices throughout the Chesapeake Bay watershed. B4Bay participants receive assistance, public recognition, awards, and information on Bay issues and innovations. All B4Bay participants receive membership certificates and window stickers for display. For more information, see www.b4b.org or contact Marylynn Wilhere at 1-800-YOURBAY or mwilhere@chesapeakebay.net.

In 2004, the practice of Guy. G. Levy, DDS and Mayer G. Levy, DDS, PC of Newport News, VA received the "Significant Achievement Award for Pollution Prevention, Small Facility" from the Chesapeake Bay Program's Executive Council for their membership in Businesses for the Bay and their commitment to minimizing environmental impacts from their office. Pictured to the right, Guy Levy, DDS receives the award from the Virginia DEQ's Tom Griffin.

The ***Virginia Environmental Excellence Program*** (or VEEP) is a voluntary program run by the Virginia DEQ to promote the development and use of Environmental Management Systems (EMS) and Pollution Prevention activities. VEEP represents the future of environmental protection in that it shifts from a command and control system to one of implied trust for proven, responsible businesses. An EMS is a structured, systematic approach to dealing with and reducing environmental impacts at a given facility. The VEEP EMS model was developed with the assistance of Virginia industries and mirrors ISO14001, the international guidance for EMS's. VA DEQ supports the use of an EMS because it ensures long-term improvements in environmental performance.

There are two types of designations within VEEP. The *Environmental Enterprise* or *E2* designation is for facilities that are in the early stages of implementing and EMS. The designation of *Exemplary Environmental Enterprise* or *E3* is given to facilities that have a fully-implemented EMS, pollution prevention program, and demonstrated environmetnal performance. Both of the designations receive public recognition and assistance services, while E3 designees are also provided high-level recognition and EPA-approved regulatory flexibility.

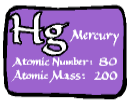
Dental offices that are using this manual should be able to attain E2 designation with minimal documentation and effort. E2 requires:

- An Environmental Policy Statement.
- A Comprehensive List of Environmental Impacts from your facility's operation & Determination of Significant Environmental Impacts.
- Goals and Objectives for Reducing Significant Environmental Impacts.
- Annual Review & Revision of your plan.

With some additional commitment and assistance from VADEQ, a dental office could develop a comprehensive EMS and achieve E3 designation. There are more than 250 Virginia facilities in the program, and these facilities are considered to be Virginia's true leaders in environmental protection. For more information or applications, please see www.deq.virginia.gov/veep or contact VA DEQ's Tom Griffin at 804-698-4545 or rtgriffin@deq.virginia.gov.

Dental Office Wastes Handling Procedures: Pollution Prevention & Best Management Practices

Mercury & Amalgam



Elemental Mercury

Prior to the accepted use of precapsulated amalgams, dentists mixed their own amalgams. Therefore, each dental office kept supplies of elemental mercury (also referred to as free, bulk, or raw mercury). Although almost all dentists have gone to precapsulated amalgams, some offices still have supplies of elemental mercury tucked away in a storeroom. This supply, especially if it is forgotten or poorly managed, exists as a potential risks to employees and can be very expensive to clean up.

- Do not continue mixing your own amalgam if you are doing so
- Recycle all unused free mercury. Many hazardous waste haulers and dental amalgam recyclers will accept elemental mercury for recycling.
- Use precapsulated alloy to eliminate the possibility of an elemental mercury spill.

✕ *Never*

- ✕ Discharge elemental mercury to the municipal sanitary sewer.
- ✕ Discard elemental mercury in the trash.
- ✕ Put elemental mercury in the sharps container.
- ✕ Discard as Red-Bag waste.

✔ *Always*

- ✔ Discontinue using elemental mercury.
- ✔ Recycle unused elemental mercury.

Amalgam

Common dental amalgam is composed of approximately 49% mercury, 35% silver, and the remainder is tin, copper, and zinc. These are all heavy metals that have the potential to significantly impact water quality, and there are regulated limits for these elements. The American Dental Association (ADA) has conducted research that indicates that amalgam does not exhibit the characteristics of a hazardous waste. Dental offices may use the ADA report as evidence indicating that scrap amalgam is not considered to be hazardous waste. However, in the end, any liabilities and the responsibility of determining the regulatory status of a waste is borne by the individual dental office. Therefore, we encourage our members to take precautions to ensure that waste and exposure are minimized.

Steps You Can Take – Some General Guidelines:

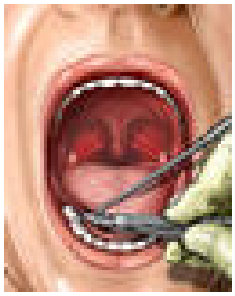
Amalgam Capsules

A. Stock a variety of amalgam capsules to minimize the amount of waste genereated.
B. Convert to pre-capsulated amalgam capsules and use the correct size needed for each procedure.
C. After mixing amalgam, the empty amalgam capsules should be placed in the non-contact amalgam container.
D. Unused amalgam and capsules with excess amalgam should be placed in an airtight container labeled “non-contact amalgam - to be recycled” and then recycled. Use standard precautions.

Recycling Amalgam

- Contract with a local recycler to recycle your amalgam wastes. Ship to a mercury reclamation facility, and keep written records of your generation, recycling, and disposal. (See Appendix A)
- "Contact Amalgam" is any amalgam that is left over from a procedure. Any amalgam that is collected in chairside traps and filters and any unused amalgam from a procedure is considered to be "contact amalgam". It should be collected and stored in an airtight container labeled as "contact amalgam-to be recycled".
- "Non-Contact Amalgam" is any amalgam capsule that is defective or expired and has not been used in a procedure. It should be collected and stored in a separate container labeled as "non-contact amalgam-to be recycled".
- Some recycling companies may pay for non-contact amalgam. If this is not the case, all recycled amalgam may be placed in the same container labeled "contact amalgam".

Other



- Do not handle mercury or mix amalgam in carpeted areas.
- Never clean up a spill using a vacuum cleaner.
- Amalgam Substitutes. Use amalgam substitutes in cases where they are clinically appropriate and ethical.
- Spills. In the event of a mercury spill, put on nitrile gloves and clean it up immediately. (Do not use latex gloves as mercury can penetrate latex.) Mercury spill kits are available from a number of sources, including: companies that specialize in Occupational Safety and Health Administration (OSHA) compliance supplies and equipment amalgam recyclers; and, dental product suppliers. Before purchasing a kit, make sure it comes with complete instructions on how to perform a spill clean up. Train several staff members in proper spill clean-up procedures.
- Emergency response contractors are also available in the event of a larger release. See Appendix D for a list of Hazardous Waste Handlers.

ADA Guidance

The ADA provides a document entitled, *ADA Best Management Practices for Amalgam Waste,* as well as a 10-minute video on handling waste amalgam. The document and video are available on the ADA website - www.ada.org/prof/resources/topics/amalgam_bmp.asp.

Scrap Amalgam

- Salvage and store all contact and non-contact scrap amalgam in separate, tightly closed containers. All scrap amalgam should be packaged, labeled, and marked as required by your amalgam recycler.
- Recycle amalgam scrap through an amalgam recycler.
- Follow the requirements of your amalgam recycler for the storage, disinfection and shipping of scrap amalgam.

If amalgam must be disinfected before shipment to your recycler, **do not** use an autoclave or any other method that utilizes heat. The heat may cause the mercury to volatilize and be released to the environment.

If you store dental amalgam scrap under used radiographic fixer, water, or other liquid, **do not**, under any circumstances, discharge the liquid into the municipal sanitary sewer. Contact your dental amalgam recycler or hazardous waste hauler for more information on how to discard this material properly.

Chairside Traps

The control of waste dental amalgam includes proper management of the traps and filters used in your office vacuum system. Disposable chairside traps are preferable to reusable traps because of the difficulty in effectively removing amalgam particles from the trap without spilling them into the drain or garbage. In addition, consider replacing 40 mesh traps with 100 mesh traps if your suction system can function adequately with the smaller mesh. Finer screens may be more effective at trapping amalgam particles. However, they may require cleaning and changing more frequently.

- Be sure to check with your dental amalgam recycler to determine if they will accept disposable chairside traps in the same container with your contact amalgam.

The following recommendations will help you to properly manage your trap systems:

Disposable & Reusable Amalgam Traps

- Use standard precautions when handling the chairside trap.
- Change chairside amalgam traps at least once a week or more often if necessary.
- Flush the vaccum system with disinfecting line solution that minimizes dissolution of amalgam (i.e. cleaners that do not contain chlorine or bleach). See Additional Resources under ADA BMP's for a list of line cleaners do not contain bleach or chlorine. http://www.ada.org/prof/resources/topics/topics_amalgawaste.pdf
- For Reusable Traps, simply empty the contents into an airtight container labeled "contact amalgam for recycling". Replace the trap. Do not rinse the trap as this could introduce amalgam into the drain. Make sure to use utility gloves, gown, mask, and protective eyewear.
- For Disposable Traps, remove the trap and place the entire trap into the airtight container labeled "contact amalgam for recycling". Install a new trap. Make sure to use utility gloves, gown, mask, and protective eyewear.

Vacuum Pump Filters (in the central vacuum)

- Replace vacuum pump filters as recommended by the equipment manufacturer.
- Use standard precautions when handling the filters. Use utility gloves, gown, mask, and protective eyewear.
- Remove the filter. While holding it over a tray or other container that can catch spills. Put the lid on the filter and place it in the contact amalgam container. When the container is full, it should be sent for recycling. Be sure to check with your amalgam recycler to ensure that they will take these filters.
- ***Do not*** dispose of used vacuum pump filters as medical waste.

✔ *Always*

- ✔ Use chair-side amalgam traps and regularly change filters.
- ✔ Collect scrap amalgam for recycling.
- ✔ Train staff in proper mercury / amalgam spill clean up procedures.

✕ Never

- ✕ Put amalgam in the sharps container.
- ✕ Put amalgam scrap where it will end up in the red biohazard or medical waste bag.
- ✕ Discard amalgam scrap in the trash.
- ✕ Place scrap amalgam down the drain.
- ✕ Clean up a mercury spill using a vacuum cleaner.
- ✕ Place extracted teeth with amalgam restorations in the red biohazard bag. After disinfecting, they should be placed in the CONTACT AMALGAM container. Use standard precautions when handling extracted teeth (utility gloves, gown, mask and protective eyewear).
- ✕ Rinse out chairside traps.

Amalgam Separators

Your office may wish to consider purchasing an amalgam separator. The ability of amalgam separators to remove amalgam from the dental wastewater may be superior to filters and traps used in chairside dental units and vacuum lines. These separator systems are used to capture amalgam in wastewater that is too fine to be removed by a trap or a screen.

Amalgam separators are used in Europe and are currently being evaluated in selected areas of the United States. Contact the Virginia Dental Association or an amalgam separator vendor for more information.

If you decide that you want to purchase an amalgam separator, be prepared to shop around for the separator that works best for you and your existing equipment. The following criteria should help you select the right system.

- The system should be effective, meaning that the company should be able to prove that it can remove the amalgam from the wastewater.
- There should be no compromise in suction power.
- You may want to consider a unit that is "hands- off," meaning that the dentist or staff does not have to perform a series of manual operations, or be required to handle and change filters.
- The captured amalgam should be recycled. Make sure that the company that sold you the unit also arranges for the recycling of the captured amalgam. The company needs to provide you with the appropriate information on how to recycle the captured amalgam.
- Simplicity of design is a plus. There will be fewer chances for something to go wrong.
- The unit should operate quietly.
- The unit should come with a "fail-safe" mechanism that protects you from a spill or back-up in the event that a blockage occurs.
- The unit should install centrally so that the whole wastewater stream passes through it before discharging into the municipal sanitary sewer system.

The unit should be reasonably priced. Obtain information from the companies on the total cost for all services, including cost of the unit over a 5-10 year period, before making a decision.

ADA Guidance

Any dentist considering the purchase and installation of an amalgam separator should read carefully "Purchasing, Installing and Operating Dental Amalgam Separators: Practical Issues" (K.R. McManus, P.L. Fan; *J. American Dental Association* 2003; 134:1054-1065).

Plumbing Replacement and Repairs

After your office adopts its new amalgam management practices, it may be a good time to clean or replace sink traps. Mercury from past practices often settles at low points such as sink traps and sumps. The slow dissolution of the mercury in a sink trap or sump can release mercury into the municipal sanitary sewer for years after past disposal practices have been corrected.

- Whenever plumbing parts are removed or cleaned, caution should be taken to avoid spilling the contents in case amalgam or mercury is present.
- Pour and brush out the sludge and handle it as you would handle contact amalgam, or have it discarded as hazardous waste. Contact your Amalgam or Mercury Recycler (Appendix A) or a licensed hazardous waste handler for further clariifcation(Appendix D).
- The plumbing parts can then be put back in place or recycled.

Additional Sources of Mercury in Dental Offices

- Sphygnomanometers – wall-mounted blood-pressure cuffs can contain up to 90 grams of elemental mercury.
- Thermometers contain approximately a gram of mercury, while laboratory thermometers can have up to 10 grams. Digital and alcohol-based substitutes are readily available.
- Thermostats and Boiler Switches can contain several grams of mercury. If you are having central air and heating upgrades or other work done, be sure to mention proper management of these items to your contractor. Recycling of these items is usually provided for through HVAC wholesalers for contractors.

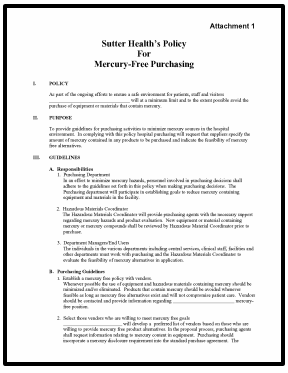
- Fluorescent Lamps contain anywhere from 3-30mg of mercury. It is best to purchase "low mercury lamps" that have 3-6mg of mercury. In any case, fluorescent lamps should be collected for recycling. Vendors can provide pickup of mail-in services. Even though fluorescent lamps contain mercury, the use of fluorescents are good for the environment because they are 4 to 5 times more energy efficient. In fact, over the lifetime of a fluorescent lamp, the excess power that is required for other types of lighting actually results in mercury emissions that are more than three times the amount of mercury that is in a lamp containing 15mg of mercury.
- Any other electrical equipment may contain mercury switches or gages and other hazardous metals. They should not be discarded in regular trash.
- Computer screens actually contain up to a gram of mercury in the lighting device.

Mercury Recycling

Remember, mercury is a hazardous material. Any of the items listed above could be considered a "hazardous waste", and disposal in regular trash could constitute a hazardous waste violation. Disposal of these items as hazardous is a costly option. However, all of the items listed above can be economically recycled.

Mercury-Free Purchasing

For most mercury-containing devices, there is a non- or low-mercury alternative. In the case of gauges, blood pressure, thermometers, thermostats, and switches, there are lots of digital alternatives. For fluorescents, low-mercury or green-tip bulbs are readily available. Financially, it may not make sense to replace all of these items in a short period of time. However, it makes sense to develop a "Mercury-Free Purchasing Policy" that states your office's intent to get away from mercury-containing equipment and devices. Let your vendors know, and they will bring you mercury-free alternatives at or near the same cost.



Attachment 1

Sutter Health's Policy
For
Mercury-Free Purchasing

I. POLICY

As part of the ongoing efforts to ensure a safe environment for patients, staff and visitors, _____ will as a minimum limit and to the extent possible avoid the purchase of equipment or materials that contain mercury.

II. PURPOSE

To provide guidelines for purchasing activities to minimize mercury sources in the hospital environment. In complying with this policy hospital purchasing will request that suppliers specify the amount of mercury contained in any products to be purchased and indicate the feasibility of mercury free alternatives.

III. GUIDELINES

A. Responsibilities

1. Purchasing Department
In an effort to minimize mercury hazards, personnel involved in purchasing decisions shall adhere to the guidelines set forth in this policy when making purchasing decisions. The Purchasing department will participate in establishing goals to reduce mercury containing equipment and materials at the facility.

2. Hazardous Materials Coordinator
The Hazardous Materials Coordinator will provide purchasing agents with the necessary support regarding mercury hazards and product evaluation. New equipment or material containing mercury or mercury compounds shall be reviewed by Hazardous Material Coordinator prior to purchase.

3. Department Managers/End Users
The individuals in the various departments including central services, clinical staff, facilities end users are responsible for working with the Hazardous Materials Coordinator to evaluate the feasibility of mercury alternatives in application.

B. Purchasing Guidelines

1. Establish a mercury free policy with vendors
Vendors should be aware that products containing hazardous materials containing mercury should be minimized and/or eliminated. Products that contain mercury should be avoided whenever feasible so long as mercury free alternatives exist and will not compromise patient care. Vendors should be contacted and provide information regarding _____ mercury-free position.

2. Select those vendors who are willing to meet mercury free goals
_____ will develop a preferred list of vendors based on those who are willing to provide mercury free product alternatives. In the proposal process, purchasing agents shall request information relating to mercury content in equipment. Purchasing should incorporate a mercury disclosure requirement into the standard purchase agreement. The

Other Dental Clinic Wastes

Regulated Medical Waste

Regulated medical wastes must be handled separately from other wastes, including hazardous wastes, because of its potential to spread infection or disease. Licensed *regulated medical waste* haulers must handle them. Dental offices are considered to be generators of biomedical waste under Virginia Regulated Medical Waste Management 9-VAC-20-120. As a generator, dental offices are subject to handling, storage, reporting, and disposal requirements.

It is important for dental offices to determine what is considered regulated medical waste and what types of medical waste must be treated or handled by a licensed transporter. Proper determination and segregation of wastes will minimize disposal costs and assure effective management of the wastes. Education of staff regarding what is and is not medical waste can greatly minimize costs associated with regulated medical waste handling (P2 through education!)

The regulated medical waste regulations were recently revised and the new regulations went into effect on December 1, 2002. The new regulations can be referenced on the VA DEQ website at http://www.deq.virginia.gov/waste/wastereg120.html. The new regulations provide more specifics relative to what is and is not a regulated medical waste. In addition, the new regulations have simplified the requirements for labeling, handling, and storage; and the Virginia DEQ has published a poster, ***Does This Go In The Redbag?*** that summarizes the *Do's and Don'ts* of regulated medical wastes handling. This poster is available at http://www.deq.virginia.gov/p2/vh2e.

Facilitate Compliance and Reduce Medical Wastes

- Use standard precautions when handling biomedical waste.
- **Redbag Reduction**. Minimize redbag wastes when possible. For a small office, treatment costs of redbag waste can be *up to 30 times more expensive* than solid waste disposal. Here are some simple suggestions:
  - Provide red-bags sparingly.
  - Consider not providing redbags in each room unless a procedure warrants.
  - Use appropriately sized red-bags.
  - Post signs (such as above) that remind workers of what does and does not need to go into a redbag (soda cans and plastic wrapping do not!).
- Maintain current Material Safety and Data Sheets (MSDS). A helpful website is http://msds.ehs.cornell.edu/.
- **Always** Label and keep good records of manifests and disposal. Be aware of state requirements for labeling, storage, and transportation. Work with a reputable medical waste hauler.
- **Never** mix regulated medical waste and hazardous waste. If these wastes are mixed, they must be managed as hazardous waste (which is very costly!).
- **Never mix amalgam with regulated medical waste because medical wastes are heat-treated.** Mixing these wastes could result in mercury being released into the environment.

- **Sharps:** The following wastes should be placed in a Sharps container and discarded through a biomedical waste disposal company recycler (Appendix C) or approved treatment technology.
  - Discarded sharps, including hypodermic needles;
  - Syringes with or without attached needle; lancets, dental scalers; scalpel blades;
  - Glass blood vials; suture needles; needles with attached tubing; glass culture dishes and Pasteur pipettes (provided such glassware is known to have been in contact with an infectious agent); anaesthetic carpules;
  - Unused, discarded hypodermic needles, suture needles, syringes and scalpel blades;
  - Many companies now provide a **Reusable Sharps Container** program. These containers get the sharps away from the handling of the main redbag wastes, and the containers are disinfected and recycled. These programs save resources by reusing the containers and usually save your facility money. Ask your medical waste hauler.

- **Body Fluids and Blood** in quantities of greater than 20 cubic centimeters must be placed in containers that are break-resistant and tightly lidded or stoppered to prevent leakage. Discard these wastes through a medical waste disposal company. Flowable blood and body fluids in quantities less than 20 cubic centimeters can be discharged into the municipal sanitary sewer or septic system.
- **Items Saturated with Blood or Body Fluids** but are not dried or fully absorbed must be treated as biomedical waste and discarded through a medical waste disposal company. (Appendix C)
- Contact Wastes – items such as latex gloves, rubber dams, and patient bibs that have come in contact with blood and/or body fluids may not be considered biomedical waste. If not dripping or saturated they may be discarded in the trash after being placed in a plastic bag.
- **Teeth without amalgam** may be given back to your patients or placed in the trash. Teeth containing amalgam should be placed in your Contact amalgam container and recycled through an amalgam recycler (Appendix A). Check to ensure that your amalgam recycler will accept teeth containing amalgam. *Do not put teeth containing amalgam in the redbag*, because redbag wastes are either autoclaved or incinerated. In either case, the mercury in the amalgam will be volatized. Recycle these teeth with your other amalgam waste. Teeth with amalgam may be disinfected by storing them in a container of glutaraldehyde or 10% formalin.

X-Rays

Consider going to digital radiographs. Computer-based dental x-ray systems can display images in seconds on a computer monitor. New systems may provide enhanced images with minimal distortion that are sharper than original x-rays. These new systems may lower x-ray exposures by more than 80% of the lowest dosage of conventional x-ray systems.

Best of all, digital systems eliminate the development process and the purchase, use, handling, and exposure from fixer and development fluids.

The purchase of new digital equipment may be cost prohibitive. If the purchase is not warranted , be sure to follow these guidelines for proper handling of X-Ray chemicals .

Recycling X-Ray Fixer Solution / Silver Recovery

Used fixer is the solution left over from X-ray processing. In a X-ray film developing operation, fixer solution is continuously added to maintain solution strength. As a result, there is generally an overflow of fixer from the bath. The concentration of silver in the overflow may vary greatly depending on type and amount of film processed. Because of this high silver concentration, silver recovery from the fixer solution is cost effective. Additionally, if this highly concentrated silver solution is disposed of, it would be a hazardous waste. The used fixer is considered a hazardous waste if it contains 5 milligrams per liter (mg/l) or more of silver.

Used fixer should be reclaimed off-site by another company, handled by a hazardous waste management firm, or reclaimed in-house. Reclaiming the silver in used fixer conserves a valuable resource and reduces your business liability. Many reclaimers will pay to take your silver, especially if you are utilizing some sort of on-site recovery/recycling unit. There are various recovery units/processes available for recycling used fixer:

- Use a Reclamation Facility or Hazardous Waste Management Firm. Used fixer can be taken to a silver reclamation facility (Appendix B) that is licensed to accept hazardous waste, or discarded through a hazardous waste hauler (Appendix D).
- **Crossover/Squeegees** are an effective option that can greatly improve silver recovery by reducing carryover; therefore keeping the silver in the fixer tank instead of lost in the wash tank.
- **Electrolytic Silver Recovery** uses two electrodes immersed in the fixer current. Silver plates onto the cathode and thiosulfate is oxidized at the anode. When properly operated, 95 percent of the potential available silver can be recovered. Combining electrolytic silver recovery with in-situ ion exchange can result in more than 99.5 percent silver recovery efficiency.
- **In-Line Silver Recovery Unit** is an electrolytic unit through which the fixer in the processor tank is recirculated and constantly delivered. This provides for a lower silver concentration in the fixer tank, and the amount of silver lost is significantly reduced. A properly designed recirculating system can lower the silver in the fixer from a concentration of 1 ounce/gal to 1 ounce/100 gals. The amount of silver carried over to the rinse water is similarly reduced.
- **Metallic Replacement Cartridge** is a method of recovery which utilizes an oxidation-reduction reaction with elemental iron and silver thiosulfate to produce ferrous iron and metallic silver. The equipment consists of a plastic container, plastic-lined steel or stainless steel drum filled with metal, usually steel wool, and some plastic hose and plumbing connections. Silver is recovered when the silver-bearing solution flows through the cartridge and makes contact with the steel wool. The iron goes into solution as an ion, and the metallic silver is released as a solid to collect in sludge at the bottom of the cartridge or is deposited on the steel wool. The yield a user can expect is determined by the silver concentrations in solution, the volume of solution that is run through the cartridge, and the care with which the operation is managed. When silver is no longer effectively removed, the silver-bearing sludge is sent to a refiner who will refine it and pay the customer for the recovered silver.
- **Chemical precipitation** involves the addition of sodium sulfide, sodium borohydride or sodium dithionite and can remove virtually 100 percent of the silver and most other metals from photographic effluent. Levels of soluble silver below 0.1 mg/l are possible; however, the filtration limitation limits usually result in total silver levels of 0.5 to 1.0 mg/L. T
- **Ion Exchange** processing removes the silver ion from solution and replaces it with a non-silver ion.

- **Evaporation** is another option for managing waste photographic solutions. The wastewaters are collected and heated to evaporate all liquids. The resulting sludge is collected in filter bags. These bags can be sent to a silver reclaimer for recovery. The major advantage of the evaporation technique is it achieves "zero" water discharge. This method would be useful to operations that do not have access to sewer connections or wastewater discharge. A disadvantage is that the organics and ammonia in the waste solution may also be evaporated, creating an air pollution problem. A charcoal air filter may be necessary to capture the organics. Filter purchase, disposal and electrical power add to operating costs.

Please check with your local publicly owned treatment works (POTW), or your local sewer authority prior to purchasing a silver recovery unit to ensure the level of silver removed meets the POTW's discharge standards. If it does, you may rinse the recovery process waste down the drain.

- **Never** discharge liquid that has gone through the silver recovery process into a septic system. It must be handled as hazardous waste. Silver recovery systems are not a viable option for offices on septic systems.

X-Ray Developer

X-ray developer is an acid that can sometimes be discharged to the local municipal sewer. However, you should check with your local authority. Never pour developer down the drain if your clinic is on a septic system. Waste X-ray developer can be saved and reused in many cases.

- **Never** mix X-ray developer and used X-ray fixer. The silver-laden used X-ray fixer is considered hazardous waste and can not be discharged to the municipal sanitary sewer. Please refer to the previous section on Used X-Ray Fixer Solution for proper handling procedures.
- If X-ray developer is accidentally mixed with used X-ray fixer, the mixture must be discarded through a hazardous waste hauler (See Appendix D).

X-Ray Film

Used X-ray film contains trace amounts of silver, although much of the silver is stripped off during the processing of the film. Despite the silver content, processed film is not considered to be a hazardous waste; therefore, it can legally be discarded into the trash. However, used and unused films can be recycled to reclaim the silver content.

- Okay: Used and unused X-ray film can legally be discarded into the trash.
- Best: Collect used X-ray films for recycling and recovery of silver.
- Best: Unused and expired X-ray film can be returned to your dealer who can then return it to the manufacturer.

Cleaners for X-Ray Developer Systems

Some cleaners for X-ray developer systems contain chromium. Chromium is considered a toxic substance that must be managed as a hazardous waste. You should check the packaging label to see if the cleaning product contains chromium.

- Okay: Check the package label or the Material Safety Data Sheet (MSDS) to see if the cleaner you use contains chromium. If it does, dispose of waste cleaners through a hazardous waste-hauler.
- Better: Ask your supplier to provide non-chromium cleaner.
- Best: Switch to digital X-ray and no cleaner is needed!
- **Never** put a cleaning solution, disinfectant or any other process waste into a septic system, regardless of its concentration. It may disrupt the proper functioning of the septic system.

Lead Foils, Shields & Aprons

Lead foil within X-ray film, protective lead shields, and lead aprons should not be put into the trash or into biohazard bags. Lead foils, shields, and aprons can be recycled for their scrap metal content. If recycled, the lead-containing materials are exempt from the hazardous waste regulations. Lead-containing items that are not recycled must be discarded as hazardous waste.

- Okay: If you are going to throw lead-containing materials away, you must legally dispose of them as hazardous waste through a hazardous waste hauler (Appendix D).
- Better: Collect lead foil and have it recycled through a scrap metal recycler. Many amalgam recyclers and biomedical waste disposal companies will also accept lead foil as a courtesy to their customers. Kodak does have a recycling program for lead foils.
- Best: Purchase lead foils, shields and aprons that are durable and will last. Ask suppliers if they are willing to "take-back" the used materials when replacing with new products.

Always remember to get documentation from the company handling your lead waste confirming that the waste has been discarded properly.

Drugs & Pharmaceutical Chemicals

You should never dispose of unused drugs and pharmaceutical chemicals in the regular trash. Many commonly used items, are actually hazardous, such as Iodine, Alcohol, silver nitrate, methanol, mercuric oxide, etc. "Mercury" is a component in many vaccines and laboratory uses, and almost all of them are considered hazardous. In addition, there are certain commonly used pharmaceuticals, such as Epinephrine, Lindane, Nicotine patches, and Warfarin, which are considered to be "acutely hazardous". Acutely hazardous wastes are significant because additional handling requirements may be required if a certain poundage is exceeded. The following website provides more information on this process as well as a list of hazardous materials: http://www.h2e-online.org/pubs/chemmin/chappf.pdf (pharms are found on pages 34-38).

"Non-hazardous" drugs shouldn't be thrown in the trash either because of liability issues. You should develop a plan for segregating and managing your unused drugs and pharmaceutical chemicals.

- **Segregate** your unused drugs from other trash. Unless you are certain that a particular drug is not designated as hazardous waste, you should assume that it is hazardous; and discard it appropriately through a licensed hazardous waste hauler (Appendix D). The hauler can assist you in developing a logical plan for segregating wastes safely and appropriately. Many companies that handle Regulated Medical Wastes will also collect diverted pharmaceutical wastes (Appoendix C).
- Do not empty unused drugs down the drain. Certain municipal sanitary sewer systems (POTW's) will allow certain items to be included in its waste stream, but you must have documentation to that effect. In general it is not a good idea because POTW's do not typically treat wastewater in order to remove these chemicals. You should never empty unused drugsor chemicals down the drain unless you have documented proof that POTW has approved this practice.
- Never discharge drugs down the drain if your office is on a septic field.
- Ask your pharmaceutical distributor for help in designating particular drugs. In addition, ask them to take back unused or expired drugs.
- Avoid accepting drug samples unless you can use them or return them.
- Do not put unused drugs in the redbag wastes because most RMW wastes are treated through steam-sterilization.

Autoclaves / Chemiclaves

Spent chemiclave solution is the liquid left over from the chemical sterilization of dental instruments. This used solution is an ignitable waste because it typically contains approximately 25% alcohol and has a flashpoint below 140ºF.

- Chemiclave solution should not be discharged to the municipal sanitary sewer or discarded into the trash because it is ignitable.
- Discard spent chemiclave solution as hazardous waste (Appendix D).
- Consider purchasing an autoclave that sterilizes instruments through a steam process rather than a chemical one.
- Never put a cleaning solution, disinfectant or any other process waste into a septic system, regardless of its concentration. It may disrupt the proper functioning of the septic system.
- Unless you have a treatment permit, never run regulated medical wastes through your autoclave/ chemiclave. Also, be sure to not place any teeth w/ fillings, waste amalgam, broken thermometers, or other wastes in your autoclave that might contain mercury.

Glutaraldehyde

Cold Sterilant Solutions that contain glutaraldehyde are not designated as hazardous waste; however, they are considered a non-RCRA (Resource Conservation Recovery Act) waste because of their toxicity. In certain cases, glutaraldehyde can be discharged to the municipal sanitary sewer as long as the proper precautions are followed.

- Contact your local POTW (Publicly Owned Treatment Works) to find out what their discharge standards are with regards to glutaraldehyde. Follow these standards when discharging glutaraldehyde to the municipal sanitary sewer system. Be sure to dilute the substance before discharging it to the municipal sanitary sewer and always flush the system with several gallons of water afterwards so the solution does not sit in the sink trap.
- If you are unable to discharge glutaraldehyde to the municipal sanitary sewer, check with your hazardous waste (Appendix D) or medical waste hauler (Appendix C) to see if they will accept the solution for recycling.
- Do not discard glutaraldehyde in a landfill as Virginia landfills are prohibited from accepting liquid wastes. A landfill designated to accept special waste could accept glutaraldehyde if it is solidified. There are various market stabilizers that will solidify the liquid.
- Never discharge glutaraldehyde down the drain if your dental office is on a septic system.

Disinfectants, Cleaners and Other Chemicals

- Follow the label directions on the product container for guidance on the proper use and handling and disposal of used disinfectants and cleaners, along with the residue remaining in the product containers. Use only what is needed for the job.
- Recycle the empty container through your local program or discard it into the trash.
- Alcohols, ethers, and peroxides are considered ignitable and must not be discharged to the municipal sanitary sewer because they could explode. These materials are considered to be hazardous waste. Unused products should be discarded through a hazardous waste hauler, or, if they will accept it, send/give unused products back to the manufacturer or supplier.
- Never put a cleaning solution, disinfectant or any other process waste into a septic system, regardless of its concentration. It may disrupt the proper functioning of the septic system.
- Purchase citrus-based or other environmentally-friendly cleaners for general janitorial and cleaning applications. Vendors supply bulk-dispensing units for many of the citrus-based cleaners, which allows one product to be used at varying diluted strengths for a wide range of applications. This will lessen staff exposure and avoid wasted, expired material disposal.

- The non-profit organization ***Green Seal*** independently tests and evaluates products. If products meet their criteria, they qualify for "Green Seal Certification". Green Seal maintains a list of commercially available cleaners and disinfectants that have me the Green Seal *Standard for Industrial and Institutional Cleaners*. This list is available at http://www.greenseal.org/certproducts.htm.

"Green" Purchasing

As a complement to the "mercury-free purchasing policy" suggested earlier in this document, consider developing a broader purchasing policy that promotes "green purchasing". A green purchasing policy would encourage your staff to consider the most "environmentally-friendly" alternative for all purchases. These days, there are "green" alternatives for everything from office paper to cleaning solutions to fixatives and solutions. Granted, you must consider price as an equally important factor, but a policy will encourage your staff to work with vendors to find materials that are cost-effective and environmentally-friendly.

Office Wastes

General Office Waste

- Make recycling of aluminum cans and plastic bottles available to your customers. They will appreciate it!
- Contact your trash hauler or local municipality for information on how to start an office waste recycling program.
- Recycle aluminum, glass, plastics, newspaper, corrugated cardboard, paperboard, and office paper through your trash hauler or local recycling program. Due to patient confidentiality issues, shred office paper prior to recycling.
- Recycle spent toner cartridges that have been used in printers and copiers. Most suppliers of toner cartridges will take back your used cartridges. Others will actually include "postage-paid" shipping boxes with your cartridge so that you can send it back when used.
- The Virginia DEQ Office of Recycling & Litter Prevention provides additional information on recycling at www.deq.state.va.us/recycle.

Fluorescent Lamps and Ballasts

- Use fluorescent lamps and ballasts. They are 4 to 5 times more efficient than traditional incandescent bulbs, and can produce significantcost savings on your energy bill.
- Recycle fluorescent lamp through a fluorescent lamp recycling facility (Appendix C). Because of their mercury content, fluorescent lamps when disposed of as a waste, typically test out as a hazardous waste. Ballasts may contain polychlorinated biphenyls (PCBs) and should also be disposed of properly through a lamp recycling facility. Do not place fluorescent bulbs or ballasts in the trash.
- Purchase low-mercury or "green –tip" fluorescents bulbs. Recycle them as well.

Batteries

- Recycle all types of batteries. Most, if not all, batteries have hazardous properties and should be recycled. Stores/dealers that sell batteries are required to collect used batteries. Not all retail stores follow this requirement, however, electronics stores such as Radio Shack and most camera shops do collect used batteries.
- Single Use Batteries. As a result of federal and state legislation, mercury is no longer added to domestically-produced alkaline batteries. However, certain other kinds of batteries – including certain button batteries, some medical batteries, and other specialty batteries – continue to contain mercury and other metals that are intentionally added.
- Use Rechargeable Batteries whenever possible to reduce wastes and costs (P2!). However, certain batteries such as nickel/cadmium (Ni/Cd) that are no longer useful are hazardous waste and should also be recycled since they contain nickel and cadmium.
- Never place batteries in the trash, biohazard bag, or sharps container.

Computers & Other Electronic Equipment

Because of the metallic components and lead that are in computer screens, old electronic equipment could actually be classified as a hazardous waste. Old computers, printers, and copiers should not be thrown out in regular trash. Many localities are now holding "Electronics Recycling" or "E-Waste" Collection days so that homeowners and small businesses might drop off these items for proper recycling. Other options include donating or selling "gently used" equipment to local organizations or employees – or leasing the equipment from a vendor, who should be responsible for the proper recycling/disposal of the old equipment. Finally, most waste handlers are now familiar with he issues regarding "E-Waste" and are willing to collect the equipment and have it recycled properly (for a fee, of course!)

- Donate Computers to Schools
- Use Lease Agreements
- Recycle Them Through a Vendor
- Never Throw Away in the Regular Trash

Energy Efficiency

An office's energy usage can be directly linked to a quantity of air emissions and an implied impact on the environment. For instance, if a typical office used 25,000 kWh in a year, the typical environmental impact from the generation of that energy in Virginia might be:

- 150 pounds of Sulfur Dioxide
- 75 pounds of Nitrous Oxide
- 30,000 pounds of Carbon Dioxide

Conserving energy and purchasing energy efficient equipment reduces the generation of power at the source, thus eliminating the need to treat the resulting emissions. Therefore, if your office reduces its energy bill by 10 percent, it can claim that it has helped avoid harmful emissions to the environment. In addition, the office pockets the cost savings!

Here are some common-sense tips that can make a significant difference in energy consumption:

- Purchase energy-efficient and EPA-approved EnergyStar computers, copiers, and other equipment that also use "sleep" mode when not in use.
- Turn off monitors whenever not in use and turn off CPU's if not in use for more than an hour.
- Turn off lights whenever not in use.
- Install motion detectors or timers for lights.
- Install energy-efficient heating and air-conditioning systems that use natural gas. There are also building designs that will more effectively ventilate using natural conditions.
- Consider installing solar panels or other alternative power sources.
- Install sky-lights and employ effective building design that makes use of outdoor lighting.
- Install directional outdoor lighting to avoid wasted light pollution.

Water Conservation

Water conservation efforts also assist in preventing pollution. As mentioned earlier, many municipal areas have Combined Sewerage Overflow problems; therefore, reducing the quantity of wastewater generation avoids the overflow of raw sewage into our rivers and the Chesapeake Bay. Certainly, all Virginians are aware that the supply of water is limited. Furthermore, the health of our ecosystems depends on the supply of clean water.

The good news is that water conservation efforts can prove very effective,
and, like energy conservation, result in direct savings to those involved. Here are some common-sense water conservation tips that your clinic might consider:

- Don't run rinse water constantly, only during procedures.
- Minimize the size of lawns and use drought-resistant grasses and plants.
- Leak Detection & Maintenance
  - Check Toilets - "silent" toilet leaks waste from 30 to 500 gallons of water per day
  - Check pipes for leaks. A small drip can waste 50 gallons a day! An inexpensive washer can usually stop leaks.
  - Adjustments to industrial toilets and urinals can usually be made to minimize excessive flushing.
  - Installation of Low-Flow Restrictors / Aerators can be installed to all faucets and showerheads. For domestic use, these two account for nearly 40% of water usage. Restrictors can reduce usage by more than 50%. Typical paybacks for these two inexpensive items are 2-6 months.
  - Policy to use "dry" clean-up methods (versus using spray water)
- Report all leaks to building maintenance personnel
- Conserve wherever possible –
  - collect "warm-up" water from faucets and use for watering plants
  - don't run water continuously while washing dishes
  - use a microwave oven to warm up water

The Environmentally Responsible Dentist

A Guide to Pollution Prevention & Proper Waste Management in Dental Offices

Supplemental Guidance for Recyclers and Wastes

Appendix A: Amalgam & Mercury Recycling

Many waste handlers are licensed to receive, transport, and manage amalgam and mercury materials, along with other hazardous materials. However, only a limited number of facilities across the country are licensed to treat and/or recycle amalgam and mercury-containing materials. It is perfectly fine to deal with a licensed waste handler that you trust and provides great service. However, you should be sure to obtain documentation that they are licensed to handle mercury-containing materials and that they are sending your materials to a licensed mercury recycler. If your materials end up disposed of improperly in a landfill or elsewhere, you may be responsible for any fines and damages.

The Virginia Dental Association has endorsed the following company as its amalgam recycler:

Healthcare Compliance Service
Palm Beach, FL
888-726-8505
www.hcstoday.com
Contact: Bruce MacArthur

There are various other companies that will provide for recycling of amalgam and other mercury-containing materials. You may contact any of these companies to negotiate this service and shipping arrangements. In addition, there are many other environmental services companies that can provide pickup of these materials. These companies are typically "go-betweens" that will eventually ship to one of the companies listed below. However, a licensed waste handler will also take care of all administrative issues related to shipping and handling of potentially hazardous material.

AERC Recycling Solutions
Ashland, VA
804-798-9295
www.aerc-mti.com

Amalgaway
Indianapolis, IN
800-267-1467
www.amalgaway.com

Bethlehem Apparatus
Hellertown, PA
610-838-7034
www.bethlehemapparatus.com

Dental Recycling North America
Hackensack, NJ
800-525-3793
www.drna.com

Enviro Medical Waste, Inc.
Tipp City, OH
866-669-9201
www.enviromedicalwaste.com

Garfield Refining Company
Philadelphia, PA
800-523-0968
www.garfieldrefining.com

Heritage Environmental Services
Indianapolis, IN
888-437-4224
www.heritage-enviro.com

Maguire & Strickland Refining, Inc.
Minneapolis, MN
800-486-2858
www.maguiref.com

Mercury Waste Solutions
Union Grove, WI
800-741-3343
www.mwsi.com

Onyx Environmental Services
Culpeper, VA
540-829-8010
www.onyxpak.com

SolmeteX, Inc.
Northborough, MA
800-216-5505
www.solmetex.com

Stericycle
Richmond, VA
804-222-8360
www.stericycle.com

*Source: this list was developed by verifying information on the ADA's List of Dental Waste Recyclers & by searching local business listings.

Appendix B: Recycling of X-Ray Fixer, Developer, & Foils

Many companies do specialize in servicing the waste management needs of the dental industry. Therefore, many of the companies that handle mercury and amalgam-related wastes will also handle other materials. Just be aware that in the case of waste fixer and developer, there are many other companies associated with photo development industry that may be able to provide the same service. In addition, the Silver Council - http://www.silvercouncil.org – is also a good resource for vendors and additional information.

Commodity Resource & Environmental
Burbank, CA
(800) 943-2811
http://www.creweb.com

CPAC Imaging
Duluth, GA 30097
800-262-9333
http://www.refiningservices.com

Dental Recycling North America
Hackensack, NJ
800-525-3793
www.drna.com

Enviro Medical Waste, Inc.
Tipp City, OH
866-669-9201
www.enviromedicalwaste.com

Heritage Environmental Services
Indianapolis, IN
888-437-4224
www.heritage-enviro.com

Maguire & Strickland Refining
Minneapolis, MN
800-486-2858
www.maguiref.com

Mercury Waste Solutions
Union Grove, WI
800-741-3343
www.mwsi.com

Onyx Environmental Services
Culpeper, VA
540-829-8010
www.onyxpak.com

Rotex Silver Recovery
Springfield, OH 45501
937-322-0198
www.rotexsilver.com

*Source: this list was developed by verifying information on the ADA's List of Dental Waste Recyclers & members of theSilver Council.

Appendix C: Regulated Medical Wastes

No matter what type of dental practice you have, you will generate some amount of Regulated Medical Wastes. You must contract with a license hauler of RMW to pick up this waste on a regular basis with a pre-determined procedure for complying with RMW regulations. There are requirements for handling, labeling, time of storage, weight, recordkeeping, and container management. A licensed transporter will be able to assist you in determining what you need to do to be in compliance with Virginia's Regulated Medical Waste Management regulations. The RMW regulations are found on the Virginia DEQ website at http://www.deq.virginia.gov/waste/medical.html.

There are only two companies in Virginia that are licensed to treat RMW:

The Virginia Healthcare Waste Management Cooperative
(operated by SciMed)
Richmond, VA
804-965-1350

Stericycle
Richmond, VA
804-222-8360
www.stericycle.com

A list of licensed RMW waste transporters is maintained at **www.deq.virginia.gov/wastes/xxxxx.** The following list is current as of 5/2005.

COMPANY	CITY	ST	PHONE
ALL CLEAN ENVIRONMENTAL GROUP	PRINCE GEORGE	VA	(804)957-6310
AMERICAN ENVIRONMENTAL GROUP	NORFOLK	VA	(757)543-7110
AMERICAN WASTE INDUSTRIES, INC.	NORFOLK	VA	(757) 543-7110
ATLAS ENVIRONMENTAL SERVICES, LLC	LORTON	VA	(703)339-9770
BESTRANS, INC.	NORTH EAST	MD	(410)398-3573
Stericycle, Inc.	CHESAPEAKE	VA	804-487-2220
Stericycle, Inc.	LYNCHBURG	VA	804-846-6800
Stericycle, Inc.	WINSTON-SALEM	NC	919-724-0842
Stericycle, Inc.	ROANOKE	VA	866-783-7422
CLEAN RESPONSE	MT. CRAWFORD	VA	(540) 442-8316
CLYM ENVIRONMENTAL SERVICES, LLC	FREDERICK	MD	(301)694-6000
COMMODORE MEDICAL SERVICES, INC.	NASHVILLE	TN	615-297-2104
ECOLOGY SERVICES, INC.	COLUMBIA	MD	(800)932-7299
ENVIRONMENTAL MANAGEMENT SERVICES INC.	ROCKVILLE	MD	(301)309-0475
ENVIROTECH OF AMERICA, INC.	EAST SYRACUSE	NY	315-463-7178
GALACTIC TRANSPORT	PLAISTOW	NH	(603) 382-5404
GENESIS ENVIRONMENTAL, LTD	MCKEESPORT	PA	(412)672-0400
IMS ENVIRONMENTAL SERVICES, INC.	NORFOLK	VA	(757)543-5718
INCENDERE, INC.	CHEASAPEAKE	VA	804-424-7710
MATSINGER ENTERPRIZES	BRIDGEPORT	PA	1-800-536-7787
MDS OF TENNESSEE LLC	MURFREESBORO	TN	(615)848-0108
MEDTRACE, INC.	NORTH EAST	MD	(410)620-2202
NATIONAL WASTE MANAGEMENT, INC.	SUTTON	MA	(508)476-1900
ONIAS MEDICAL WASTE GROUP	SUFFOLK	VA	(757)532-7170
PETROCHEM RECOVERY SERVICES	NORFOLK	VA	(757)627-8791
SAFE WASTE, INC.	CHARLOTTE	NC	704-588-2100
SHEPARD ENTERPRISES INC.	NEWPORT NEWS	VA	(757)877-9195
SOLID WASTE TECHNOLOGIES, INC.	EAST BRUNSWICK	NJ	732-967-1070
SAFETY KLEEN	CHESTER	VA	804-748-3767
STERICYCLE	HAW RIVER	NC	(401)769-5800
Stericycle, Inc.	BALTIMORE	MD	301-276-7400
STICK PROOF	RALEIGH	NC	800-678-7845
US NAVY - CHEATAM ANNEX	WILLIAMSBURG	VA	804-887-7411
USL ENVIRONMENTAL SERVICES INC.	STAFFORD	VA	(540)288-1176
VA HEALTHCARE WASTE TRANSPORT / SCI-MED .	ROANOKE	VA	(800)662-0088
VA HEALTHCARE WASTE TRANSPORT / SCI-MED	ROANOKE	VA	804-365-9150
W.E.L., INC.	CONCORD	VA	(800)847-2455
Waste Management Services of North Carolina	CHARLESTON	WV	304-342-4867
WASTE MANAGEMENT, INC. MEDICAL SERVICES	OAK BROOK	IL	609-587-1500

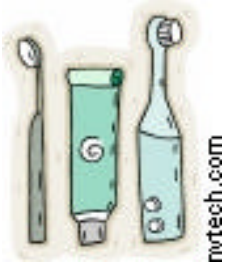
Appendix D: Hazardous Waste Management

If not collected for recycling, all materials that contain amalgam or mercury could be classified as hazardous wastes. In addition, batteries, computer equipment, various drugs, cleaners, X-ray wastes, could all be classified as hazardous wastes; and should not be thrown out with regular wastes. Please note that the treatment of RMW wastes typically involves only sterilization or incineration, both of which would not render the waste non-hazardous. As in the case of regulated medical wastes, hazardous waste handlers must be licensed to transport these items for recycling and/or disposal as hazardous wastes.

When disposing of hazardous materials, you must contract with a licensed transporter of hazardous waste OR with a qualified consultant who subcontracts to one of these companies. The Virginia DEQ maintains a list of licensed transporters, which is available by contacting the Virginia DEQ's Julia King-Collins at 804-698-4237 or jkcollins@deq.virginia.gov. Fmore information on licensing requirements for hazardous waste transporters, please see **www.deq.virginia.gov/waste/hazardous.**

Appendix E: Solid Waste Recycling

The availability of recycling services is a function of recycling markets and the policies of your local jurisdiction. Typically, local governments do provide for recycling opportunities for its citizens, whether it be in the form of curbside pick-up or drop-off sites. However, businesses are often time left out of this equation and are left to find their own agreements and contracts for recycling. Check with your local jurisdiction to see if they do provide for "commercial recycling services" or assistance. Depending upon the vendors available, your office might be able to recycle cans, glass, plastic, newspapers, cardboard, and office paper. For more information on recycling vendors and markets, reference the Virginia DEQ's website on Recycling & Litter Prevention at http://www.deq.virginia.gov/recycle.



Always *Brush Your Teeth…*

…No Cavities, No Amalgam Waste!

Virginia Dental Association

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY